REMARKS

Claims 1-39 are now pending in the application. Claims 1-11 and 28-37 are withdrawn. Claims 12, 13, 17, 20, 22, 24 and 25 are amended herein. New Claims 38 and 39 have been added herein. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

REJECTION UNDER 35 U.S.C. § 103

Claims 12-16, 20-21 and 23-27 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Brachman (U.S. Pat. No. 3,940,467). This rejection is respectfully traversed.

It is initially noted that Claims 12 and 20 have been amended to recite in part: "heating the combination after the mixing step to form a liquefied combination".

The Examiner states in part "Brachman discloses the basic claimed method for forming components including (1) mixing a combination having a polymeric material resin and a blowing agent, (2) heating the combination to form a liquefied or molten combination".

Applicants respectfully disagree with the Examiner's position. Brachman teaches a thermoplastic resin is heated in an extruder by a suitable heating means and is melted by the externally applied heat and by shear forces of the extruder. This heating takes place in a first compression zone 13b of the extruder. See column 5, lines 31-35. The heated resin is then advanced through a first metering zone. See column 5, lines 35-37. After the first metering zone and therefore after and separate from the heating of the

resin, water as a foaming agent is introduced under pressure in a second feed zone 13d using an injecting means. See column 5, lines 37-41. The foaming agent (water) is very specifically controlled within a range of not more than about 2.0% of the weight of the plastic resin to prevent swirl and/or indent of the finished part. See column 6, lines 25-31.

Claims 12 and 20 have been amended to further clarify that the combination of materials is formed and the combination is heated after mixing the combination of materials. Brachman does not teach or suggest that a combination of both a resin and a foaming agent is mixed and the combination is heated after the mixing step as recited in Applicant's amended Claims 12 and 20.

Brachman further teaches that the foaming agent (water) is added under pressure. See column 5, lines 39-40. The heated resin and the pressurized foaming agent are not fully mixed until after they reach a second compression zone 13e of the extruder. See column 5, lines 49-57. The pressurized combination of the heated resin and the subsequently added water is forced by a piston 26 and rod 27 into a cavity C. See column 6, lines 2-5. It is only after the heated resin and pressurized water enter the lower pressure of the cavity C that the water flashes to steam to froth the thermoplastic resin. See column 6, lines 5-12. It is inherent that water premixed with a resin heated to about 475°F (see column 7, line 13) would flash to steam as the resin is being heated if only external heat and shear energy are provided as identified by Brachman in column 7, lines 9-11. The process of Brachman teaches that the water is added after the initial heating of the resin and the water is prevented from flashing to steam by maintaining backpressure on the system until the mixture of resin and water passes through a

second compression zone and reaches cavity C. See column 4, lines 9-10. Brachman therefore teaches away from combining the resin and the foaming agent into a mixture and heating the combination after the mixing step.

The suggested modification of Brachman therefore does not render amended Claims 12 or 20 obvious. The Examiner is respectfully requested to withdraw the 35 U.S.C. § 103(a) rejection of Claims 12 and 20. Because Claims 13-16 depend from Claim 12, and Claims 21 and 23-27 depend from Claim 20, the suggested modification of Brachman therefore does not render Claims 13-16, 21 or 23-27 obvious for at least the same reasons. The Examiner is respectfully requested to withdraw the 35 U.S.C. § 103(a) rejection of Claims 13-16, 21 and 23-27.

Brachman does not render Claim 13 obvious for at least the following additional reasons.

Claim 13 has been amended to recite in part:

"initiating motion of a ram to perform the injecting step;

changing a ram progression speed during the injecting step;".

Support for this amendment is found in the specification, in paragraph 0027. Brachman does not teach or suggest that a progression speed of multi-zone screw 13 is changed during the injection operation. In direct contrast to amended Claim 13, Brachman teaches that 1) a heated and liquefied resin is advanced by an extruder; 2) water is subsequently injected under pressure into the liquefied resin; 3) the mixture of the liquefied resin and water is forced into an accumulator 21; and 4) the accumulator (not the extruder) is used to force the mixture into a mold. See column 5, line 31 to

column 6, line 12. Neither a speed of the extruder or the accumulator is varied by Brachman. The suggested modification of Brachman therefore does not render amended Claim 13 obvious.

Brachman does not render Claim 24 obvious for at least the following additional reasons.

Claim 24 has been amended to recite in part:

"positioning at least one coolant injection pin in the mold in fluid communication with the liquefied combination in the mold."

Support for this amendment is found in the specification, in paragraph 0025. Brachman teaches only that the surfaces of the mold are cooled. See column 4, lines 25-27. Brachman does not teach or suggest a coolant injection pin that provides fluid communication with the liquefied combination (liquefied resin and foaming agent) in the mold. The suggested modification of Brachman therefore does not render amended Claim 24 obvious.

Brachman does not render Claim 25 obvious for at least the following additional reasons.

Claim 25 has been amended to recite in part:

"flowing an inert gas into the coolant injection pin and through the coolant injection pin into the liquefied combination to operably cool and expand the liquefied combination."

Support for this amendment is found in the specification, in paragraph 0025. As

noted above, Brachman teaches only that the surfaces of the mold are cooled. See column 4, lines 25-27. Brachman teaches that upon entering the lower pressure area of Cavity C the water (acting as a foaming agent) expands to force the liquefied resin into Cavity C of the mold. The outer surfaces of the mold cool the foamable mixture. See column 4, lines 18-27.

Brachman does not teach or suggest a coolant injection pin that provides fluid communication with a liquefied combination (liquefied resin and foaming agent) in the mold which further allows an inert gas to contact the liquified combination which both cools and expands the liquefied combination. The suggested modification of Brachman therefore does not render amended Claim 25 obvious.

NEW CLAIMS

Claims 38 and 39 have been added herein. Support for these claims is found in the specification, paragraph 0027. The Examiner is respectfully requested to enter new Claims 38 and 39.

ALLOWABLE SUBJECT MATTER

The Examiner states that claims 17 and 22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form. Accordingly, Applicants have amended Claim 17 to include the limitations of Claim 12. Because claims 18 and 19 depend from amended Claim 17, Claims 17-19 should now be in condition for allowance. Applicants have also amended Claim 22 to include the limitations of base Claim 20. Claim 22 should therefore now be in condition for allowance.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

Dated: 9/29/04

By: _____

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